CLAIMS

What is claimed is:

1. A power converter comprising:

a shared first-side stage to receive an input;

a plurality of second-side converter stages coupled to the first-side stage, each of second-side converter stages to generate an output; and

control circuitry to monitor the outputs of the second-side converter stages and generate a control signal for each output, wherein the control signal turns off switching elements of a corresponding one of the second-side converter stage to regulate the output.

2. The power converter of claim 1 further comprising:

a switching signal generator to generate a switching signal for switching on and off elements of the first-side stage, and switching on and off switching elements of the plurality of second-side converter stages;

a plurality of second-side driver circuits, each to provide one of the second-side converter stages with a combined signal corresponding with the switching signal and one of the control signals, the second-side driver circuit turning off switching elements of the second-side stages in response to the one control signal.

3. The power converter of claim 2 wherein the second-side converter stages each comprise a transformer and a set of second-side switching elements which are alternatively turned on and off in response to the switching signal from a corresponding second-side driver circuit, the second-side switching elements being turned off based on the control signal to regulate the output.

4. The power converter of claim 3 wherein the switching signal has a duty cycle of up to 50%, and the combined signal has a duty cycle of less than the switching signal depending on the control signal.

5. The power converter of claim 2 wherein the first-side stage comprises first and second switching elements which are alternatively switched on and off, and wherein the plurality of second-side stages comprise a first and a second second-side stage, the first second-side stage comprising third and fourth switching elements which are alternatively switched on and off, the second second-side stage comprising fifth and sixth switching elements which are alternatively switched on and off.

6. The power converter of claim 5,

wherein the switching signal turns on the first, third and fifth switching elements at substantially the same time,

wherein the combined signal associated with the first second-side stage turns off the third switching element before the switching signal turns off the first switching element,

wherein the combined signal associated with the second second-side stage turns off the fifth switching element before the switching signal turns off the first switching element.

7. The power converter of claim 6 further comprising:

a first steering diode to inhibit current from flowing from the first to the second second-side stage when the third switching element is turned off before the fifth switching element and while the first switching element is conducting; and

a second steering diode to inhibit current from flowing from the second to the first second-side stage when the fifth switching element is turned off before the third switching element and while the first switching element is conducting.

8. The power converter of claim 7 further comprising:

a freewheeling diode associated with each of the third, fourth, fifth and sixth switching elements to allow transformer inductive leakage current to flow when the associated switching element is turned off.

9. The power converter of claim 1 wherein the shared first-side stage is a high side stage to receive an input voltage that is greater than an output voltage, and the plurality of second-side stages are low-side stages.

10. The power converter of claim 1 wherein the shared first-side stage is a low-side stage to receive an input voltage that is lower than an output voltage, and the plurality of second side stages are high-side stages.

11. A power converter comprising:

a single set of high-side switching elements;

a plurality of sets of low-side switching elements coupled to the high-side switching elements; and

control circuits to turn off the low side switching elements of at least one of the sets before the high side switching elements to regulate an output.

12. The power converter of claim 11 further comprising:

steering diodes coupling the low-side switching elements with the high-side switching elements, the steering diodes allowing current to flow from the high-side switching elements to the low-side switching elements, the steering diodes inhibiting current from flowing between the sets of low-side switching elements.

13. The power converter of claim 12 wherein each switch of the low-side sets has a corresponding one of the steering diodes.

14. The power converter of claim 11 further comprising:

a freewheeling diode associated with each switch of the low-side sets, the freewheeling diodes allowing leakage current to flow from one of a plurality of transformers when the associated switch it turned off.

15. The power converter of claim 11 wherein an input current is split between the sets of low-side switching elements after flowing through one of the high-side switching elements, the split based on output loading of the sets of low-side switching elements.

16. The power converter of claim 11 further comprising:

a switching signal generator to generate switching signals for the high-side and low-side switching elements;

a plurality of low-side control circuits each associated with one of the sets of low-side switching elements, each low-side control circuit to monitor one of a

plurality of outputs and to generate a control signal to change a duty-cycle of the low-side switching elements of the associated set.

17. The power converter of claim 16 further comprising:

a low-side driver circuit for each set of low-side switching elements, the low-side driver circuits to provide switching signals to the low-side switching elements based on the switching signals from the switching signal generator and one of the control signals, wherein low-side driver circuit, based on the control signal from the associated control circuit, changes the duty cycle of the switching signal provided by the low-side driver circuit to the low-side switching elements to regulate an associated output.

18. The power converter of claim 17 wherein when a first switch of a first set of low-side switching elements is turned off before a second switch of a second set of low-side switching elements, a steering diode associated with the first switch inhibits current from flowing from a transformer associated with the first set of low-side switching elements to a transformer associated with the second set of low-side switching elements.

19. The power converter of claim 17 further comprising an optical coupler to electrically isolate the low-side control circuit from the low-side driver circuitry.

20. The power converter of claim 11 further comprising a plurality of transformers, each transformer associated with one of the sets of the low-side switching elements to generate one of a plurality of outputs.

21. A method comprising:

generating a pulse width modulated switching signal;

switching input current through switching elements of a high-side stage in response to the switching signal;

switching a first portion of the input current through switching elements of a first low-side stage in response to a first control signal and the switching signal; and

monitoring an output of the first low-side stage to generate the first control signal, the first control signal turning off the switching elements of the first low-side stage to regulate the output.

22. The method of claim 21 further comprising:

switching a second portion of the input current through switching elements of a second low-side stage in response to a second control signal and the switching signal; and

monitoring an output of the second low-side stage to generate the second control signal, the second control signal turning off the switching elements of the second low-side stage to regulate the output of the second low-side stage.

23. The method of claim 22 further comprising inhibiting current from flowing between the first and second low-side stages when the switching elements of one of the low-side stages is turned off before the other.